Dehcho Boreal Caribou Study Progress Report, April 2010

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Background History

In response to the new federal Species at Risk Act (SARA) and following extensive consultation with the Sambaa K'e Dene Band (SKDB) of Trout Lake, the Department of Environment and Natural Resources (ENR), Dehcho Region initiated an ecological study of boreal caribou in the Trout Lake area during the spring of 2004. SKDB saw the benefits of combining information from this study with their own traditional knowledge study (Yúndíit'qh TEK study) to fill information gaps about boreal caribou, and in supporting the Sambaa K'e Candidate Protected Area. An initial ten female boreal caribou were collared in the Celibeta Lake area in order to document seasonal range use and movements, calving period/locations, and fidelity of seasonal range use over a 4-5 year period. Collared females also provided population information on calf production, calf survival, and adult female survival. Other ecological studies of boreal caribou had been initiated by ENR in other regions of the Northwest Territories to increase knowledge of boreal caribou throughout their range (for example Nagy et al. 2005; Johnson 2007), so that in the face of increasing development pressures informed decisions regarding land use could be made.

Snow conditions restricted caribou distribution in 2004. At the request of SKDB, an additional 8 satellite collars were deployed on female boreal caribou in spring 2005. Subsequently, SKDB requested an additional 4 collars be deployed on female boreal caribou in January 2006. Previous annual progress reports of the Trout Lake Caribou Study provides more detailed information (Larter and Allaire 2005; 2006a).

In response to their requests and after extensive consultations with the Fort Simpson Métis Local (FSML) and Liidlii Kue First Nations (LKFN), ENR Dehcho Region initiated an ecological study of boreal caribou in the Ebbutt Hills area in spring 2005 when 5 satellite collars were deployed on female boreal caribou. The study area included portions of the proposed Mackenzie Gas Pipeline; study objectives were similar to the Trout Lake study. Subsequently, at the requests of Jean Marie River First Nation (JMRFN), Pehdzeh Ki First Nation (PKFN) in Wrigley, and Nahanni Butte Dene Band (NBDB), the Ebbutt Hills study area was expanded and an additional 9 collars (5 satellite and 4 VHF) were deployed in the study area in January 2006. A progress report of the Ebbutt Hills Study provides more detailed information (Larter and Allaire 2006b).

Boreal caribou use the boreal forest without respecting study area or jurisdictional boundaries. Collars have been deployed on female boreal caribou throughout the Dehcho Region with continued support of local First Nations. Acho Dene Koe Band of Fort Liard expressed interest in having caribou collared in their traditional areas in 2007 and in 2010 one caribou was collared in Ka'a'gee Tu (Kakisa) traditional lands. Subsequent to a recommendation from 2006 Dehcho Wildlife Workshop, all boreal caribou work has been treated as one large Dehcho study. Subsequently progress reports (Larter and Allaire 2007; 2008; 2009) have combined the background information and updates from both studies. This progress report does similarly.

Collar Descriptions

All collars are equipped with a very high frequency (VHF) beacon so they can be located from the ground or air with a receiver and antenna system. All collars deployed after March 2004 have a release mechanism that is programmed so that the collar drops off the animal on a specific date. All release mechanisms have worked as programmed. VHF and satellite transmissions continue for varying lengths of time after release providing the opportunity for ENR staff to retrieve the collar from the field. Larter and Allaire (2008) provide detailed figures of the collars.

Satellite collars (Telonics ST-20 model 3610) have been deployed annually from the start of the study; one new generation TAW-4610 was deployed in 2009 (Table 1). These collars were programmed to provide daily locations from 1 May to 14 June (the anticipated calving period) and locations once every 3 days for the remainder of the year with a lifespan of 4 years.

GPS collars (Telonics TGW-3680) have been deployed since January 2007 (Table 1); three new generation TGW-4680 collars were deployed in 2010. GPS collars provide 3 locations daily (every 8 hours), with a lifespan of approximately 40 months. These collars provide the most detailed movement and range use information.

We have documented the calving period of female boreal caribou based upon locations collected over the past 3 years from GPS collared females. We have now programmed a detailed duty cycle into all satellite collars deployed in 2010 (and in future) so that they will be able to tell us if a caribou calved and on what date, like the GPS collars do. Collars provide 2 locations a day during peak calving (6-25 May), 1 location a day for 2 weeks before (26 April-5 May) and after (26 May-10 June) peak calving, 1 location every 4 days from 11 June-15 February, and 1 location every 3 days from 16 February-25 April. Collar lifespan is still 4 years even with detailed calving information.

VHF collars (Telonics MOD600) were deployed once, in January 2006 (Table 1). They do not transmit signals to satellites. We must fly to locate them with a receiver and antenna system. There are no plans to deploy these collars in future.

Collar Deployments

Collars have been deployed annually since the program began in 2004 (Table 1); 87 boreal caribou females have been collared throughout the Dehcho (Figs. 1 & 2). All caribou were captured by net-gunning the animal from a helicopter. ENR contracts a professional net-gunning crew that must follow strict animal care guidelines (GNWT Animal Care Committee Standard Operating Procedures for Handling Caribou). Blood, a hair sample (for DNA), and feces are collected from each captured animal as long as the opportunity arises. Prior to 2009, the DNA sample was an ear plug. Collars are deployed on caribou residing in areas requested by First Nations. No animal has been injured in capture operations. An aerial fixed-wing reconnaissance was flown prior to

capture work in 2004 and 2005. Such flights are kept to a minimum to reduce disturbance, and in most years from 2006-2009 were not conducted except at First Nation request. In 2010 we conducted two flights in different areas because the snow and flat light conditions made locating caribou difficult. Local observers participated in these flights. We successfully deployed 18 collars in February 2010 and hope to have enough active collars so that we will not need to deploy in February 2011.

Table 1. The number and type of collars deployed in each year.

Date caribou collared	Satellite (ST-20, 3610)	Satellite (TAW-4610H)	GPS (TGW-3680)	GPS (TGW-4680)	VHF (Mod 600)
March 2004	10				
March 2005	13				
January 2006	9				4
January 2007	8		9		
February 2008	4		4		
February 2009		1	7		
February 2010	9		6	3	
TOTAL	53	1	26	3	4

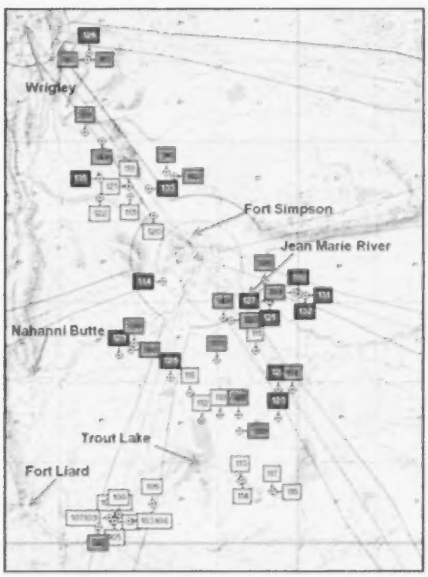

Figure 1. Locations of 51 female boreal caribou collared in , , 2006, 2007 (see colour for locations).

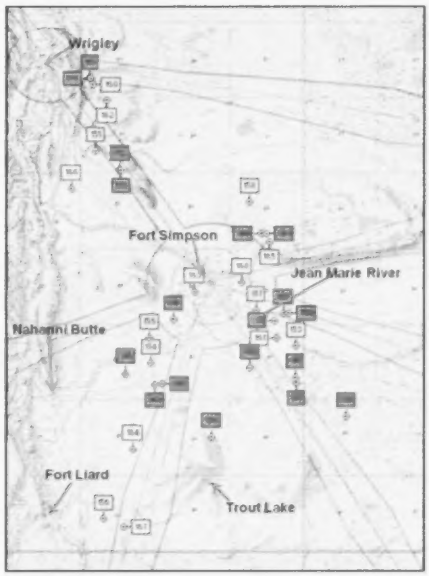

Figure 2. Locations of 36 female boreal caribou collared in , 2009, 2010, (see colour for locations).

Results

Home Ranges

We calculated the 100% minimum convex polygon (MCP), which is a line connecting all of the outside points where a caribou was located, for 50 collared female caribou. All caribou had locations collected over a minimum 12 month period; 26 females had locations collected from ≥24 months (Fig. 3). Mean home range size was 2824.2km^2 (range 205-11,484.8km^2; median 1964km^2). Home ranges of seven caribou included northeastern British Columbia; one caribou range included northwestern Alberta (Fig. 3). Two boreal caribou collared in a northeastern British Columbia study have been located southeast of Trout Lake (Brad Culling pers. comm.) One boreal caribou collared in the Sahtu has been located <50km north of Wrigley (B. Tracz pers. comm.). One caribou (#149 in our study) was originally collared in the Bistcho Lake/Cameron Hills area (Johnson 2007) of a South Slave region study. It was re-captured in February 2007 near Trainor Lake and equipped with another collar. Its home range calculation is based solely from the locations after it was re-collared (Fig. 4). Home range sizes we report are generally similar to those reported for the Cameron Hills and Gwich'in study areas (means of *ca.* 3000km^2; Nagy et al. in prep. a).

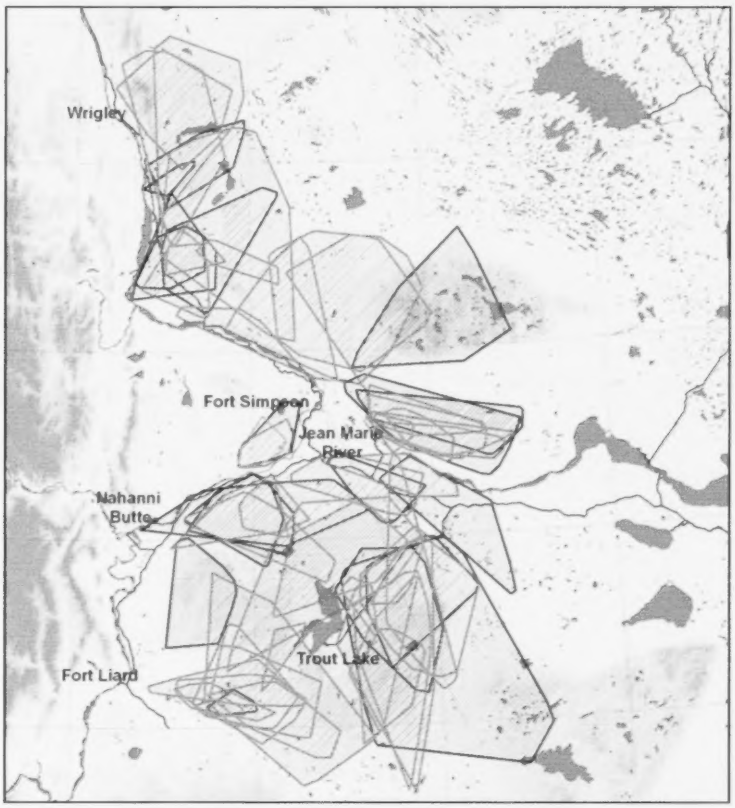

Figure 3. Home range estimates (100% minimum convex polygon (MCP)) of 50 collared female boreal caribou. Red satellite collar, black GPS collar.

During the calving period, females space out throughout all boreal caribou range (Fig 5). Female boreal caribou remain widely dispersed and are usually solitary during calving. They may be found with another female during the post-calving period and throughout the summer (Johnson 2007; Larter and Allaire 2006a; b; Nagy et al. 2005).

Caribou #149

Originally collared in the Bistcho Lake/Cameron Hills study area 10 March, 2005, she later moved into the Trainor Lake area where she was re-captured and equipped with a new collar February 2007(Fig. 4). Using locations from both collars, her estimated home range (100% MCP) is 12,837.8km^2. The individual collar range estimates (100% MCP) are 7082.0km^2 for Bistcho Lake/Cameron Hills and 11,484.8 for the Dehcho and show substantial overlap (Fig. 4). In January 2010 she returned to the Bistcho Lake area.

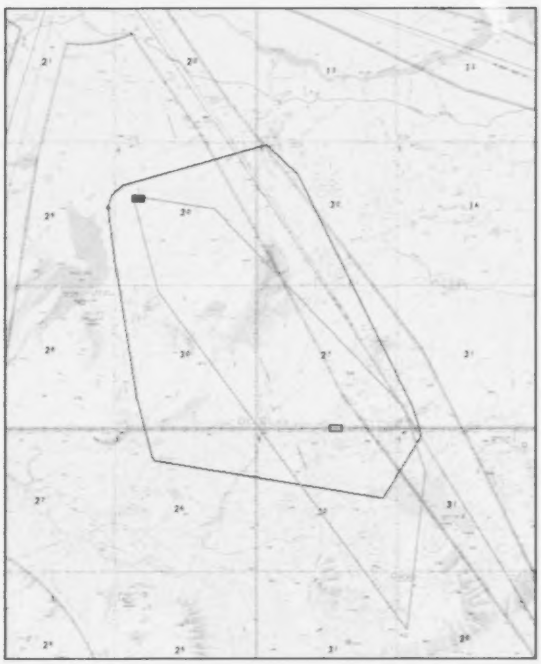

Figure 4. 100% MCP for locations prior to 24 February in red. 100% MCP for locations since 24 February in blue. ■ initial collar deployment 10 March, 2005. ■ recollared, 24 February, 2007.

Figure 5. Calving sites ● of collared female boreal caribou in 2009 dispersed widely throughout boreal caribou range.

Movements

Daily movements by female caribou decline dramatically immediately prior to calving and are lowest around the time when the calf is born. Pooled movement data from 108 calving events by caribou equipped with GPS collars in the Dehcho, Bistcho Lake/Cameron Hills, and Gwich'in boreal caribou studies showed that average daily movement dropped from *ca.* 6km/day, 2 days prior to calving, to *ca.* 0.2km/day on calving day and remained at *ca.* 1km/day for about 1 week post-calving (Nagy et al. in prep. b.; Fig. 6). This shows that one can determine if and when a collared female had a calf by plotting daily movement data from GPS collared females, eliminating the need to fly out and directly observe whether GPS collared females produced a calf. During the fall/rut period (1 September – 15 October) both group size and daily movements increase as males frequent groups. During early winter (November) and late winter (April) we find the greatest directional movements; movements are dramatically reduced during mid-winter (February). Group size is largest during March-April but caribou can still be found in small groups.

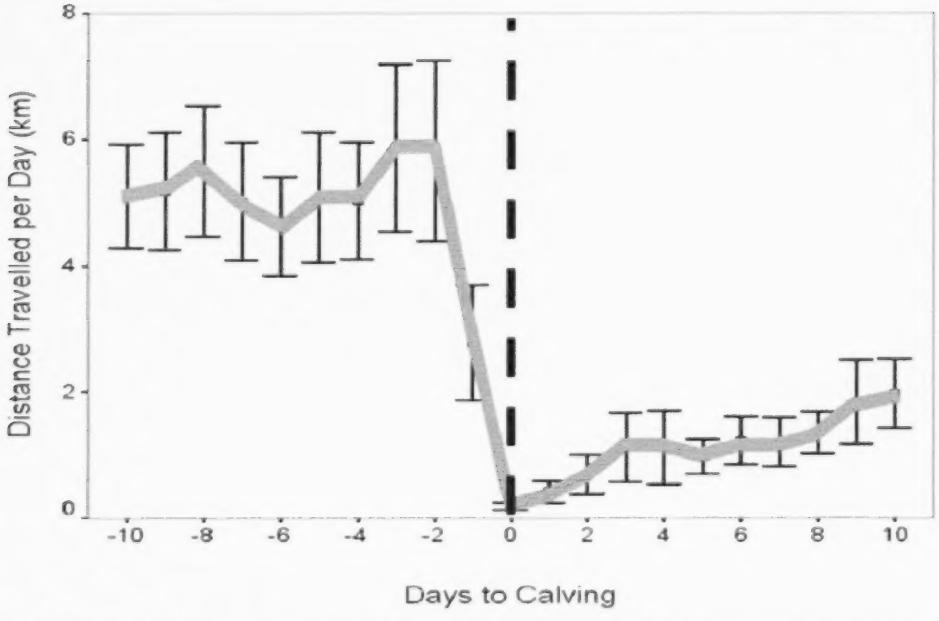

Figure 6. Daily distances travelled by female boreal caribou in relation to calving date pooled over 108 calving events from Nagy et al. in prep. b.

Relocation Flights – primarily for VHF collared animals

From 2 March 2009 to 2 March 2010 eight relocation flights were made primarily to relocate the lone remaining female caribou equipped with a VHF collar and the satellite collars which were only providing VHF transmissions. One flight was associated with a moose survey and two flights were associated with the February capture. See Appendix 1 for a brief account of these flights. The VHF collared animals have ranged over large

areas therefore flights with fixed-wing are flown at higher altitude (generally ≥3000 feet above ground level); visual observations are not necessary. Only one VHF collared caribou (#134) was relocated regularly this year. Collar #133 was not relocated and we suspect has ceased to transmit. Collar #132 released on schedule and has yet to be retrieved. Some flights were completed in association with fire operations. The number of relocation flights we make will be reduced in future.

May/June Female/Calf Surveys

These surveys are conducted with a helicopter because their goal is to locate all collared female caribou and determine whether or not they have newborn calves with them. All caribou and other wildlife observed on these surveys are recorded (Table 2). This survey provides us with an estimate of annual calf production, but it cannot detect neonatal deaths nor late born calves. This survey sometimes provides the additional opportunity to pinpoint and/or retrieve downed collars. We successfully located all caribou with functioning collars in 2006 (n=22), 2007 (n=30), 2008 (n=28). In 2009 we conducted the survey on 1, 2 and 5 June and reduced the survey to locate only females with functioning satellite and VHF collars. Calving events for GPS collared females were determined from their daily movements. Caribou were widely distributed in all surveys requiring 1900km, 1800km, 2580km and 1540km of flight lines for 2006, 2007, 2008, and 2009, respectively. It is unlikely we will fly these surveys in future because almost all collared caribou have GPS or newly programmed satellite collars which will allow us to determine calving events, dates, and locations.

Table 2. Results of visual female/calf surveys in 2006-2009.

	2006	2007	2008	2009
Total number caribou observed	45	74	74	23
Number of female caribou	27	42	41	11
Number of calf caribou	16	28	31	7
Number of calves per 100 female caribou	56.2	66.7	75.6	63.6
Number of collared caribou with calves	12	19	24	7
Number of collared caribou observed	22	30	28	9
Number of calves per 100 collared females	54.5	63.3	85.7	77.8
Number of male caribou	0	2	1	3
Number of yearling caribou	0	1	0	1
Number unknown sex/age class caribou	2	1	1	1
Number of moose observed	2	7	12	6
Number of black bear observed	1	3	6	1

February/March Classification Surveys

We assume that calves of the year observed in these late winter surveys are recruited into the population. Surveys are conducted with a helicopter because we need to see all collared caribou and determine the sex/age class of all caribou seen. Photographs of caribou groups are taken to verify the presence of calves. During these surveys we have observed calves with collared caribou that did not have calves with them during the post-calving survey of the previous May/June. Most likely these calves were born late or had remained hidden from view in spring. Other wildlife observed on these surveys is also recorded (Table 3). Surveys were completed on 1-2 March, 2006, 26-27 February, 2007, 3-5 March, 2008, 2-4 March, 2009 and 1-2 March 2010 with 170, 216, 241, 291 and 235 caribou classified, respectively. We have been fortunate to locate all caribou with properly functioning VHF beacons: 24 in 2006, 33 in 2007, 35 in 2008, 37 in 2009 and 39 in 2010. Caribou were widely distributed requiring flight lines of approximately 1200km, 1600km, 1700km, 2000km and 1750 in 2006, 2007, 2008, 2009 and 2010 respectively. Caribou were classified into calves (8-10 months old), yearlings (20-22 months old), females ($\geq$32 months old), and males ($\geq$32 months old), based upon antler size and shape and animal size. Some yearlings may have been misclassified as females or males $\geq$32 months old. In March 2010 caribou were frequently in heavily forested areas more than in previous years. The many fresh bed sites we observed during the survey indicated we were definitely not seeing all the animals while surveying. This is reflected in the lower total number of animals observed during the 2010 survey (Table 3).

Eight of 11 collared female caribou (72.7%) that we know had calves in May 2005 (based upon a limited fixed-wing survey) were seen with calves in the March 2006 survey. Six of 13 collared female caribou (46.2%) that we know had calves in May 2006 were seen with calves in the February 2007 survey. Eight of 21 collared female caribou (38.0%) that we know had calves in May 2007 were seen with calves in the March 2008 survey. Thirteen of 25 collared female caribou (52.0%) that we know had calves in May 2008 were seen with calves in the March 2009 survey. Four of 8 satellite collared female caribou observed (50%) and 7 of the 14 GPS collared female caribou (50%) that had a calved or were predicted to have calved based on movement data in May 2009 were seen with calves in the March 2010 survey. Caribou 148 had a calf in May 2009 but her collar released in September before the survey. The number of calves per 100 adult females that we observed in these surveys has been higher recently and is slightly higher than that reported for caribou in the adjacent Bistcho Lake/Cameron Hills study area (Johnson 2007), but remains lower than for caribou in Gwich'in study area in the Lower Mackenzie Valley. Wolf predation on boreal caribou in the Lower Mackenzie Valley is negligible unlike in the Bistcho Lake/Cameron Hills and Dehcho study areas (Johnson 2007; J. Nagy pers. comm.).

Table 3. The number of caribou classified and other wildlife observed during caribou sex/age classification surveys in 2006-2010 conducted in February-March.

	2006	2007	2008	2009	2010
Total number caribou observed	170	216	241	291	235
Number of female caribou	94	114	145	160	128
Number of calf caribou (8-10 months old)	27	26	34	50	45
Number of yearling caribou (20-22 months old)	13	6	1	1	1
Number of male caribou	35	70	61	80	61
Number unknown sex/age class caribou	1	0	0	0	0
Number of calves per 100 female caribou	28.7	22.8	23.4	31.3	35.2
Number of moose observed	18	38	15	31	23
Number of wolves observed	2	1	0	0	0

Mortalities and Releases

From 1 April 2009 to 31 March 2010, six collared caribou died and 11 other collars released as scheduled. All but 3 of the released collars were retrieved during the spring/summer, refurbished and redeployed in February 2010. Collar #142 we believe submerged with the spring melt as its signal was lost and we were unable to retrieve it. With few fires during summer 2009, fire operations provided us with the helicopter time to retrieve a majority of the downed collars.

To date 33 collared caribou have died during the study. There is strong evidence that 24 (73%) were killed by wolves and 1 was killed by a black bear; 5 (15%) caribou were harvested, 2 died of causes likely associated with old age, and one collar has yet to be retrieved so cause of death is currently unknown. Most (n=27; 82%) mortalities occur between late-March and mid-July in any year, a similar time period when the majority of female mortalities have occurred in the Bistcho Lake/Cameron Hills study area (Johnson 2007). Other mortalities occurred in August (n=2), September (n=1), October (n=1) and November (n=2). Some mortalities occurred near prominent game trails not associated with seismic activity.

Teeth have been retrieved from 12 of 33 caribou that died and were aged at Matson's Lab (Missoula, Montana). Age is determined based upon counting cementum annuli on teeth (the incisor is best), similar to counting the rings of a tree (Fig. 7). 1 June has historically been used as the birth date for caribou (Matson 1981), however this may need to be adjusted based upon 15 May being the mean birth date for boreal caribou in the Dehcho (Nagy et al. in prep. b.). There were some surprisingly old females (Fig. 8).

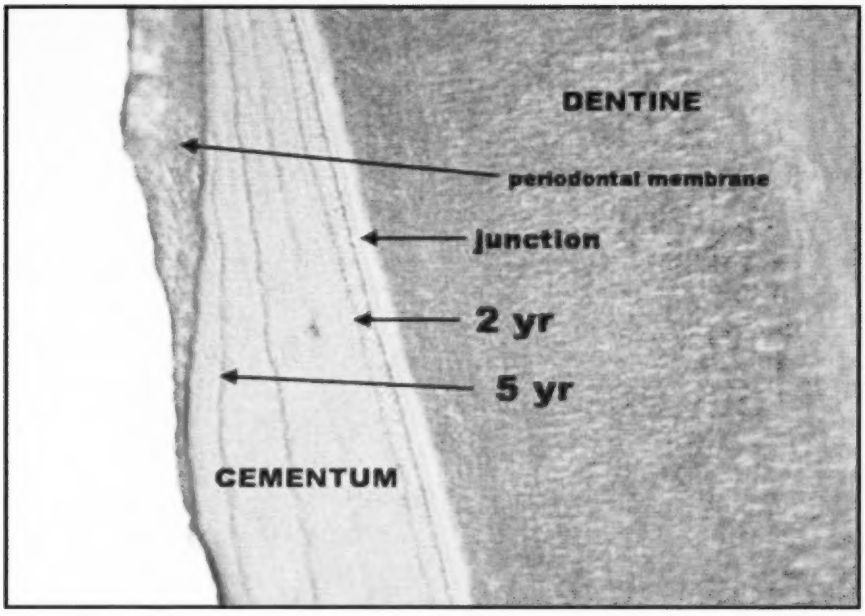

Figure 7. An example of a stained section of the root of a tooth showing cementum annulia (dark blue lines).

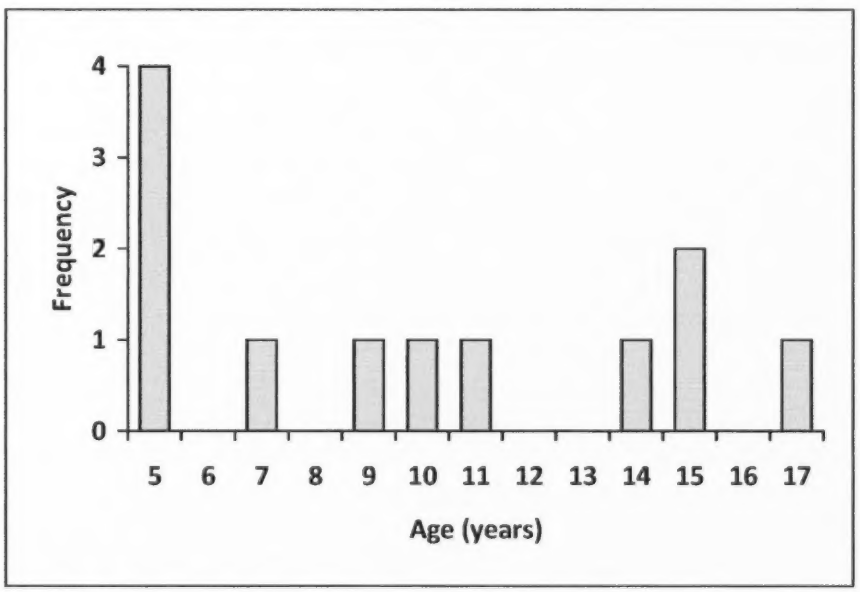

Figure 8. Ages of 12 female boreal caribou at the time of their death. The age was determined by counting cementum annuli of teeth.

Adult Female Preganancy

Boreal caribou have had a high incidence of pregnancy like other species of deer. Pregnancy of collared females was determined by measuring the levels of progesterone in blood serum. At least 91% (79 of 87) of females tested were pregnant; 4 were not pregnant and the remaining 4 were borderline (Table 4). Of note when cross referencing with age data is that 5 of the collared female caribou were pregnant at 10, 10, 14, 14, and 16 years of age.

Table 4. The number of blood samples indicating pregnancy, borderline, and non-pregnancy of boreal caribou females over time, based upon serum progesterone levels.

	2004	2005	2006	2007	2008	2009	2010
Pregnant	10	12	10	16	7	7	17
Borderline	0	0	2	1	0	0	1
Not Pregnant	0	1	1	0	1	1	0
Total	10	13	13	17	8	8	18

Adult Female Survival

Based upon the number of collared caribou that have died during the course of the study to date (Kaplan and Meier 1958; Pollock et al. 1989) our best estimate of mean adult survival over 5 years for the Dehcho combined is 76%. Survival differs between years and areas however mean annual adult female survival remains consistent on both sides of the Mackenzie River (Table 5.) and low in comparison to estimates from studies in Bistcho Lake/Cameron Hills (Johnson 2007) and Gwich'in (Nagy et al. 2005) areas. Low adult female survival reduces the population rate of increase.

Estimated Population Rate of Increase

We estimated the population rate of increase measured from 1 April to 31 March for 5 successive years from all caribou collared throughout the entire study area. We made separate estimates from caribou collared north and south of the Mackenzie River. We based the estimate on annual female survival and the ratio of calves per 100 adult females of collared animals in March (Hatter and Bergerud 1991). A rate of increase, or λ, of 1 indicates population stability, < 1 indicates population decrease, and > 1 indicates population increase. Small sample sizes affect the confidence of the estimate. For 2009-10 λ was > 1, likely because female survival had remained consistent while the number of calves seen in late-winter had increased (Table 5; Fig. 9). The higher estimated annual rate of increase recently is encouraging. However, the mean estimated rate of increase over the past 5 years is 0.90 and if we had a population of 1000 adult female caribou when we started the study in 2004, and used our estimated annual population rates of increase we would have 606 adult females today (Fig. 10). The

encouraging demographic 2009-2010 results have to be put into the context of what was reported for the previous years of the study.

Table 5. The estimated annual population rate of increase (λ) for 5 successive years. Rates for the south Dehcho are calculated for caribou collared south of the Mackenzie River, rates for the north Dehcho for caribou collared north of the Mackenzie River.

South Dehcho

Year	Female Survival Rate	Ca:100 Females	Rate of Increase (λ)
2005-2006	0.6250	0.2587	0.7179
2006-2007	0.6429	0.2616	0.7396
2007-2008	0.9375	0.2558	1.0750
2008-2009	0.7391	0.4444	0.9503
2009-2010	0.8500	0.4667	1.1087

North Dehcho

Year	Female Survival Rate	Ca:100 Females	Rate of Increase (λ)
2005-2006	0.6000	0.3318	0.7193
2006-2007	0.7500	0.1999	0.8333
2007-2008	0.8125	0.1937	0.8996
2008-2009	1.0000	0.3333	1.2000
2009-2010	0.8125	0.6667	1.2188

Dehcho Combined

Year	Female Survival Rate	Ca:100 Females	Rate of Increase (λ)
2005-2006	0.6191	0.2881	0.7232
2006-2007	0.6923	0.2286	0.7817
2007-2008	0.8750	0.2335	0.9906
2008-2009	0.7857	0.3611	0.9588
2009-2010	0.8333	0.5238	1.1290

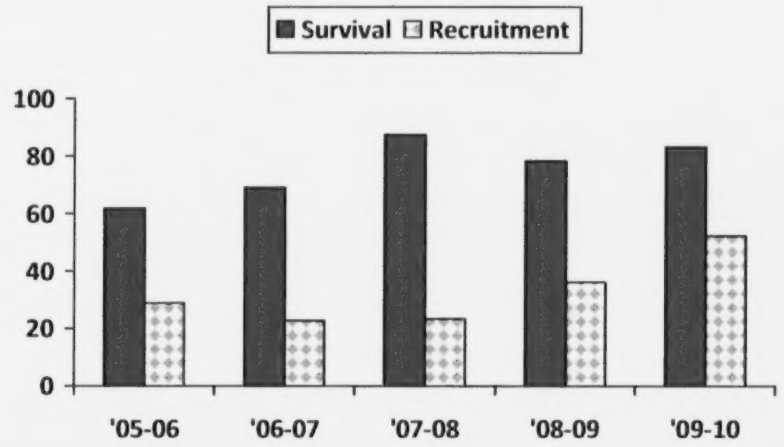

Figure 9. Adult female survival (%) and calves/100 adult females in March (recruitment) for the Dehcho study area from 2005-06 to 2009-10. Based on radio-collared female caribou.

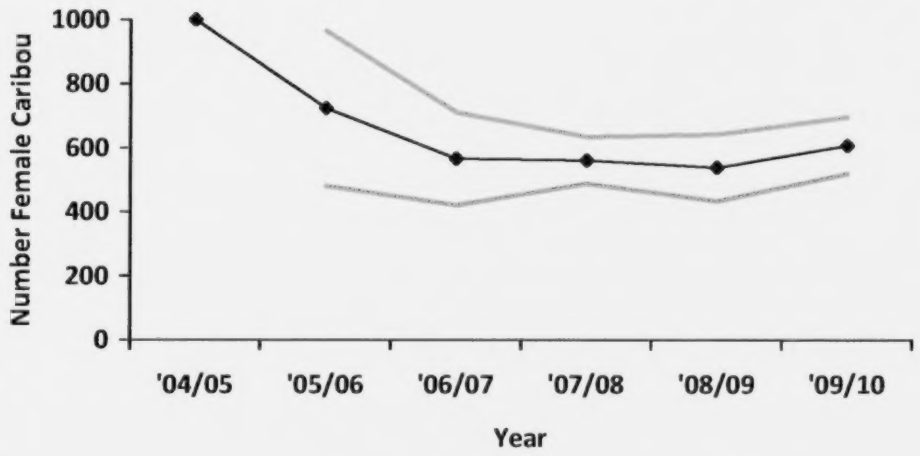

Figure 10. The estimated number of female caribou in each year of the study starting with a population of 1000 and using the annual rates of increase calculated for the 5 successive years. The green and red lines represent the upper and lower 95% confidence intervals.

Response to Anthropogenic Linear Features

Analyses of location data obtained for boreal caribou outfitted with GPS collars in the combined Gwich'in, Dehcho, and Bistcho Lake/Cameron Hills study areas show that seismic lines affect caribou movements. Caribou use areas near seismic lines less than if they were randomly wandering around. Caribou show reduced use of areas near seismic

lines as the density of seismic lines increases within their home ranges (Nagy et al. in prep. a). Caribou also travel faster when they do cross seismic lines, but they cross seismic lines less frequently than expected if they were randomly wandering around within their home ranges (Nagy et al. in prep. a). For caribou in stable or increasing populations, <20% of their annual home ranges were within 250m of linear developments and the density of seismic lines in their annual home ranges was <0.5km per km^2 (Nagy et al. in prep. a.).

Although the Dehcho is considered a relatively pristine landscape, there is a noticeable linear footprint. Digital records of the footprint have been used as part of the Dehcho Land Use Plan (DLUP). Using the DLUP digital linear footprint files we calculated the distance of the 28 caribou mortalities from the nearest linear feature. Seismic lines do not kill caribou, predators that travel these lines do. Of 25 mortalities related to wolf or bear predation, 9 (36%) occurred ≤500m from a linear feature (Table 6.). The five harvested caribou were also located ≤500m from a linear feature. The 2 animals whose death was not related to predation died 150 and 200m from the nearest linear feature. There is a much higher impact of predators in the Dehcho than the Gwich'in study area likely because the diversity and abundance of other prey, like moose, deer and beaver is greater. A greater number of predators traveling the same amount of linear features would have more of an impact on the caribou population. This may be why our estimates show that caribou numbers have declined over the past 5 years in the Dehcho.

Table 6. The number of caribou mortalities, related to wolf or bear predation, found at various distances (metres) from the nearest linear feature. The linear features are based upon the DLUP linear footprint.

Distance from DLUP Linear Feature (m)	<100	100-250	251-500	501-1000	>1000
Number	2	4	4	6	9

Disease and Parasites

A detailed paper documenting the presence of disease and parasites in blood and fecal samples of boreal caribou collected from both the Dehcho and Bisccho Lake/Cameron Hills study areas is being published (Johnson et al. in press). Samples from this study area including data from 2010 indicate minor infestations of the eggs of *Ostertagia* which have been found in 51 of 113 (45%) fecal samples. Six fecal samples (5%) had eggs of *Eimeria*, three (3%) had eggs of *Moniezia* and one fecal sample had eggs of lungworm (*Parelaphostrongylus* spp.). *Giardia* and *Cryptosporidium* eggs have been found in 3 (3%) and 2 (2%) of 113 fecal samples, respectively. All 22 blood samples submitted for *Brucella* testing were negative, but 6 (27%) indicated exposure to herpesvirus.

Miscellaneous Topics and Findings of Note

Collar Issues

The remaining 8 satellite collars originally deployed in February 2005 released on schedule during 2009. A total of 9 satellite and 6 GPS collars were retrieved, refurbished, and deployed in February 2010 with an additional 3 new generation GPS collars that were purchased. All refurbished satellite collars were programmed with the new detailed duty cycle so they can determine calving events.

The remaining 8 satellite collars originally deployed in February 2006 are scheduled to release during June-September 2010. We will attempt to retrieve as many of them as is logistically feasible so they can be refurbished with the new duty cycle and be available for redeployment. People at the 4th biannual Dehcho Regional Wildlife Workshop suggested that a minimum of 30 collars be maintained throughout the study area.

Co-operative Work Projects

Sambaa K'e Dene Band (SKDB) conducted a track count study starting in February 2007 and ending in 2009. ENR assisted with the initial stages of the study. Caribou and wolf fecal samples have been collected opportunistically during this study. SKDB has made these samples available to ENR and the results from analyses of these samples were included in the disease and parasite paper (Johnson et al. in press). ENR provides location information for caribou residing in the SKDB track count study area under a co-operative data sharing agreement. The report was recently completed (Crosscurrent Associates Ltd. 2009).

All location data from this study has been incorporated with data from the Gwich'in and Bistcho Lake/Cameron Hills studies into a territorial-wide analysis. The various analyses include resource selection models and detailed movement data to assess how boreal caribou use their range seasonally and how caribou use the range in relation to different current levels of disturbance throughout the range of boreal caribou in the Northwest Territories (Nagy et al. in prep c; d).

We continue to work co-operatively with other researchers conducting boreal caribou studies. We assisted with the classification survey of the North Cameron Hills in March 2010. One of the caribou collared in the Dehcho study was located by biologists working in northern Alberta.

Deliverables

ENR provides an annual progress report of Dehcho boreal caribou to its First Nations partners and to the Biophysical Program, which is posted on the ENR website. ENR

continues to provide quarterly maps to its First Nations partners. The maps show the ranges used by each individual collared caribou over the previous 3 months.

A presentation of the program and its recent findings was made at the Dehcho Naxehcho (Elders) and Harvesters Gathering in Fort Providence, March 2010.

Scientific manuscripts on various aspects of the study continue to be drafted and submitted for journal publication. One manuscript on diseases and parasites is in press.

Posters on the results to date of the Dehcho boreal caribou program were presented at the 1st South Slave Wildlife Workshop held October 28-29, 2009.

Posters and presentations will be made at the upcoming 5th biannual Dehcho Regional Wildlife Workshop and the 13th North American Caribou Workshop held in Winnipeg in October.

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Appendix 1. Brief descriptions of relocation and collar retrieval flights conducted from April 2009 to March 2010.

All relocation flights.

- 14 May, fixed-winged aircraft to relocate #134 & 143.
- 9 July, fixed-winged aircraft to relocate #134 & 143.
- 12 August, fixed-winged aircraft to relocate #134 & 143.
- 2 September, fixed-wing aircraft to relocate #134 & 143.
- 28 October, fixed-wing aircraft to relocate #134 & 143.
- 22 November, a fixed-winged aircraft to relocate #134 &143, during moose survey.
- 22 February, fixed-winged aircraft to relocate #134 & 143 and to get information on caribou distribution for the caribou capture.
- 23 February, fixed-winged aircraft to relocate #145 and to get information on caribou distribution for the caribou capture.

All flights to retrieve collars from dead animals.

- 24 May, drove to River Between Two Mountains on the Wrigley highway, retrieved collar #162, was harvested by a hunter.
- 2 June, helicopter to retrieve collars #151, 158.
- 5 June, helicopter to retrieve collar #167.
- 13 July, helicopter to retrieve collar #156.
- 10 August, helicopter to retrieve collar #139.
- 17 August, helicopter to retrieve collar #147.
- 21 September, boated up the Willowlake River to retrieve collar #155, was harvested by a hunter.

All flights to retrieve collars that had released from live animals.

- 1 June, helicopter to retrieve collar #114.
- 2 June, helicopter to retrieve collar #119.
- 6 July, helicopter to retrieve collar #112.
- 7 July, helicopter to retrieve collar #116.
- 10 July, helicopter to retrieve collar #111.
- 10 August, helicopter to retrieve collar #115.
- 29 August, helicopter to retrieve collar #120.

Appendix 2. A time line of each collared caribou since 2004. The collar type (GPS, Sat = Satellite, VHF) is noted as well as whether most recently only VHF signals are being received.

Animal #186 (GPS)
- 27 Feb/10 collared
- 2 March/10 seen with calf

Animal #185 (GPS)
- 27 Feb/10 collared
- 2 March/10 seen alone, collar is resetting

Animal #184 (GPS)
- 26 Feb/10 collared
- 1 March/10 seen in group of 6 with calf

Animal #183 (Sat)
- 26 Feb/10 collared
- 1 March/10 seen in group of 6 without calf

Animal #182 (GPS)
- 26 Feb/10 collared
- 1 March/10 seen with cow

Animal #181 (Sat)
- 26 Feb/10 collared
- 1 March/10 seen in group of 3 without calf

Animal #180 (Sat)
- 26 Feb/10 collared
- 1 March/10 seen in group of 8 with calf

Animal #179 (GPS)
- 25 Feb/10 collared
- 2 March/10 seen in group of 11 with calf

Animal #178 (Sat)
- 25 Feb/10 collared
- 1 March/10 seen in group of 3 with calf

Animal #177 (GPS)
- 25 Feb/10 collared
- 2 March/10 seen alone

Animal #176 (Sat)
- 25 Feb/10 collared
- 2 March/10 seen in group of 3 without calf

Animal #175 (Sat)
- 25 Feb/10 collared
- 2 March/10 seen in group of 5 without calf

Animal #174 (GPS)
- 24 Feb/10 collared
- 1 March/10 seen with cow

Animal #173 (GPS)
- 24 Feb/10 collared
- 1 March/10 seen in group of 8 with calf

Animal #172 (Sat)
- 24 Feb/10 collared
- 1 March/10 seen with calf

Animal #171 (Sat)
- 24 Feb/10 collared
- 1 March/10 seen in group of 13 with #160 with calf

Animal #170 (Sat)
- 23 Feb/10 collared
- 2 March/10 seen in group of 7 with #137 with calf

Animal #169 (GPS)
- 23 Feb/10 collared
- 2 March/10 seen alone

Animal #168 (GPS)

- 19 Feb/09 collared
- 2 March/09 seen in group of 5 without calf
- 1 March/10 seen in group of 4 with calf

Animal #167 (GPS, died)

- 18 Feb/09 collared
- 3 March/09 seen in group of 7 without calf
- 21 March locations became stationary, suspect wolf predation
- 5 June/09 collar retrieved

Animal #166 (GPS)

- 19 Feb/09 collared
- 2 March/09 seen in group of 10 with #155 without calf
- 1 March/10 seen in group of 4 without calf

Animal #165 (GPS)

- 19 Feb/09 collared with calf
- 2 March/09 seen in group of 14 with calf
- 1 March/10 seen in group of 10 with calf

Animal #164 (GPS)

- 18 Feb/09 collared
- 3 March/09 seen in group of 4 without calf
- 2 March/10 seen in group of 3 without calf

Animal #163 (GPS)

- 19 Feb/09 collared
- 3 March/09 seen in group of 9 without calf
- 1 March/10 seen with calf

Animal #162 (GPS, harvested)

- 19 Feb/09 collared
- 2 March/09 seen in group of 11 without calf
- 5 May/09 shot by harvester
- 24 May/09 collared retrieved

Animal #161 (Sat)

- 18 Feb/09 collared
- 2 March/09 seen in group of 5 without calf
- 2 March/10 seen with cow

Animal #160 (Sat)

- 17 Feb/08 collared with calf
- 3 March/08 seen in group of 5 with calf
- 28 May/08 no visual, too much static
- 2 March/09 seen in group of 14 without calf
- 1 March/10 seen in group of 13 with #171 with calf

Animal #159 (Sat)

- 16 Feb/08 collared
- 4 March/08 seen in group of 24 without calf
- 21 April/08 located with 134
- 28 May/08 seen without calf
- 3 March/09 seen in group of 8 without calf
- 1 March/10 seen in group of 10 without calf

Animal #158 (Sat, died)

- 17 Feb/08 collared
- 3 March/08 seen with cow
- 28 May/08 seen with calf
- 2 March/09 seen in group of 6 with calf
- Died 10 May/09
- 2 June/09 collar retrieved

Animal #157 (Sat, only VHF active)

- 17 Feb/08 collared
- 3 March/08 seen in group of 5 without calf

- 23 May/08 lost satellite signal
- 29 May/08 seen in group of 3 with calf
- 2 March/09 seen in group of 5 with calf
- 1 March/10 seen in group of 5 without calf

Animal #156 (GPS, died)
- 18 Feb/08 collared with calf
- 4 March/08 seen in group of 4 with calf
- 29 May/08 seen without calf
- 3 March/09 seen in group of 14 with calf
- Died 13 April/09
- 13 July/09 collar retrieved

Animal #155 (GPS, harvested)
- 17 Feb/08 collared
- 3 March/08 seen in group of 6 without calf
- 28 May/08 seen with calf
- 2 March/09 seen in group of 10 with #166 without calf
- Died 29 July/09
- 21 Sept/09 collar retrieved by boat

Animal #154 (GPS)
- 17 Feb/08 collared
- 5 March/08 seen in group of 19 without calf
- 29 May/08 seen with calf
- 4 March/09 seen in group of 5 with calf
- 2 March/10 seen in group of 7 with calf

Animal #153 (GPS)
- 16 Feb/08 collared with calf
- 4 March/08 seen in group of 4 without calf
- 29 May/08 seen without calf
- 2 March/09 seen in group of 5 with calf
- 2 March/10 seen in group of 4 with calf

Animal #152 (GPS)
- 23 Jan/07 collared
- 27 Feb/07 seen in group of 6 without calf
- 30 May/07 seen with calf
- 4 March/08 seen with cow
- 30 May/08 seen with calf
- 3 March/09 seen in group of 10 without calf
- 2 March/10 seen in group of 9 with calf

Animal #151 (GPS, harvested)
- 22 Jan/07 collared
- 26 Feb/07 seen in group of 6 without calf
- 29 May/07 seen with calf
- 3 March/08 seen in group of 8 without calf
- 28 May/08 seen with calf
- Died 8-10 Aug/08 by Fish Lake
- 2 June/09 collar retrieved

Animal #150 (GPS, harvested)
- 22 Jan/07 collared
- 26 Feb/07 seen in group of 2 without calf
- 29 May/07 seen with calf
- 3 March/08 seen with cow
- Died 26-28 May/08 likely shot by harvester
- 17 June/08 collar retrieved

Animal #149 (GPS)
- 24 Feb/07 collared
- 27 Feb/07 seen in group of 7 without calf
- 30 May/07 seen with calf
- 4 March/08 seen in group of 10 without calf
- 29 May/08 seen with calf
- 3 March/09 seen in group of 9 with calf

- 3 March/10 seen in group of 12 without calf

Animal #148 (Sat, released)

- 24 Jan/07 collared
- 26 Feb/07 seen in group of 12 without calf
- 30 May/07 seen without calf
- 4 March/08 seen with calf
- 29 May/08 seen with calf
- 2 March/09 seen in group of 3 without calf
- 30 Sept/09 collar released
- 2 March/10 collar located, did release as scheduled

Animal #147 (Sat, died)

- 22 Jan/07 collared
- 26 Feb/07 seen in group of 8 without calf
- 30 May/07 seen without calf
- 3 March/08 seen in group of 9 without calf
- 28 May/08 seen with calf
- Died 20-26 June/08
- 17 August/09 collar retrieved

Animal #146 (Sat, only VHF active)

- 21 Jan/07 collared
- 27 Feb/07 see in group of 11 with calf
- 30 May/07 seen with calf
- 4 March/08 seen in group of 4 with calf
- 29 May/08 seen without calf
- 2 July/08 lost satellite signal
- 3 March/09 seen in group of 3 with #108 without calf
- 2 March/10 seen in group of 4 with calf

Animal #145 (Sat, only VHF active)

- 21 Jan/07 collared
- 27 Feb/07 seen in group of 3 without calf
- 30 May/07 seen without calf
- 3 March/08 seen in group of 4 with calf
- 29 May/08 seen with calf
- 2 July/08 lost satellite signal
- 2 March/09 seen in group of 5 with calf
- 1 March/10 seen in group of 4 with calf

Animal #144 (Sat, harvested)

- 23 Jan/07 collared
- 26 Feb/07 seen in group of 10 without calf
- Died 5-6 April/07 shot by WY chief
- 12 April/07 collar retrieved

Animal #143 (Sat, only VHF active)

- 21 Jan/07 collared
- 26 Feb/07 seen in group of 6 without calf
- 29 May/07 seen with calf
- 20 Nov/07 seen in group of 4
- 04 Sept/07 lost satellite
- 4 March/08 seen in group of 6 without calf
- 26 March/08 located, no visual
- 21 April/08 located, no visual
- 29 May/08 not located, no signal
- 3 March/09 seen in group of 2 without calf
- 14 May/09 located, no visual
- 1 June/09 seen with calf
- 9 July located, no visual
- 12 Aug/09 located, no visual
- 2 Sept/09 located, no visual
- 28 Oct/09 located, no visual
- 22 Nov/09 located, no visual
- 22 Feb/10 located, no visual
- 2 March/10 seen in group of 4 without calf

Animal #142 (Sat, unknown status)

- 22 Jan/07 collared
- 26 Feb/07 seen in group of 10 without calf
- 29 May/07 seen with calf
- 3 March/08 seen in group of 4 without calf
- Died before 9 May/08
- 28 May/08 went to last known satellite location but no VHF transmission, likely underwater

Animal #141 (Sat, died)

- 23 Jan/07 collared
- 26 Feb/07 seen in group of 2 without calf
- Died 27-31 May/07
- 13 July/07 collar retrieved

Animal #140 (GPS, died)

- 24 Jan/07 collared
- 26 Feb/07 seen in group of 3 without calf
- 30 May/07 seen without calf
- Died 30 Oct-4 Nov/07
- April 25/08 collar retrieved

Animal #139 (GPS, died)

- 21 Jan/07 collared
- 27 Feb/07 seen in group of 6 without calf
- 30 May/07 seen in group of 4 with calf
- 3 March/08 seen with calf
- 29 May/08 seen with calf
- 2 March/09 seen in group of 3 without calf
- Died 6 July/09
- 10 August/09 collar retrieved

Animal #138 (GPS)

- 23 Jan/07 collared
- 27 Feb/07 seen in group of 4 without calf
- 30 May/07 seen without calf
- 4 March/08 seen in group of 8 without calf
- 29 May/08 seen with calf
- 3 March/09 seen in group of 17 without calf
- 2 March/10 seen in group of 3 without calf

Animal #137 (GPS)

- 23 Jan/07 collared
- 27 Feb/07 seen in group of 5 without calf
- 29 May/07 seen with calf
- 5 March/08 seen with calf
- 29 May/08 seen in group of 3 with calf
- 3 March/09 seen in group of 13 with calf
- 2 March/10 seen in group of 7 with #170 with calf

Animal #136 (GPS)

- 23 Jan/07 collared
- 26 Feb/07 seen in group of 5 without calf
- 29 May/07 seen without calf
- 5 March/08 seen in group of 19 without calf
- 29 May/08 seen with calf
- 7 March/09 seen in group of 7 without calf
- 2 March/10 seen in group of 3 without calf

Animal #135 (VHF, died)

- 21 Jan/06 collared
- 1 March/06 seen in group of 4 without calf
- 30 May/06 without calf
- 28 Sept/06 no visual
- 23 Feb/07 seen in group of 6 without calf
- Died 23-28 May/07
- 31 May/07 collar retrieved

Animal #134 (VHF)

- 21 Jan/06 collared
- 1 March/06 seen in group of 3
- 29 May/06 seen with calf
- 16 Sept/06 seen in group of 4
- 26 Feb/07 seen in group of 2 without calf
- 29 May/07 seen without calf
- 15 Feb/08 seen in group of 13 without calf
- 4 March/08 seen in group of 24 without calf
- 26 March/08 located, no visual
- 21 April/08 located with 159
- 28 May/08 seen with calf
- 3 March/09 seen in group of 9 with calf
- 14 May/09 located, no visual
- 1 June/09 seen with calf
- 9 July/09 located, no visual
- 12 Aug/09 located, no visual
- 2 Sept/09 located, no visual
- 28 Oct/09 located, no visual
- 22 Nov/09 located, no visual
- 22 Feb/10 located, no visual
- 1 March/10 seen in group of 3 with calf

Animal #133 (VHF, unknown status)

- 21 Jan/06 collared
- 1 March/06 seen with calf
- 30 May/06 seen with calf
- 23 Jan/07 seen in group of 10 without calf
- 26 Feb/07 seen in group of 3 without calf
- 29 May/07 seen with calf
- Unable to relocate since Dec/08

Animal #132 (released VHF not retrieved)

- 22 Jan/06 collared
- 1 March/06 seen in group of 9 with calf
- 29 May/06 approx. location not pregnant
- 16 Sept/06 seen in group of 2 without calf
- 26 Feb/07 seen in group of 3 without calf
- 30 May/07 seen with calf
- 15 Feb/08 seen in group of 5 without calf
- 4 March/08 seen in group of 5 without calf
- 26 March/08 located, no visual
- 21 April/08 located, no visual
- 29 May/08 not located, unable to relocate since 21April/08
- 1 March/09 programmed to release from caribou
- 2 March/09 located collar in mortality mode, no caribou seen

Animal #131 (Sat, released)

- 22 Jan/06 collared
- 1 March/06 seen with calf
- 29 May/06 without calf
- 16 Sept/06 seen in group of 3 cows without calf
- 21 Jan/07 seen in group of 5 with calf
- 27 Feb/07 seen in group of 5 without calf
- 30 May/07 seen with calf
- 03 March/08 seen in group of 8 with calf
- 29 May/08 seen with calf
- 2 March/09 seen in group of 4 with calf
- 15 April/09 collar released

Animal #130 (Sat, died)

- 22 Jan/06 collared
- 1 March/06 seen in group of 7 without calf
- 29 May/06 without calf
- Died 1-7 July/06
- 23 Aug/06 collar retrieved

Animal #129 (Sat, died)

- 20 Jan/06 collared
- 1 March/06 seen in group of 6 without calf
- 30 May/06 seen with calf
- 16 Sept/06 with calf
- 21 Jan/07 seen in group of 4 with calf
- 26 Feb/07 seen in group of 10 with calf
- 29 May/07 seen with calf
- 05 March/08 seen without calf
- Died 18-22 May/08
- 29 May/08 collar retrieved

Animal #128 (Sat, only VHF active)

- 20 Jan/06 collared
- 2 March/06 seen in group of 5 without calf
- 30 May/06 seen in group of 4 with calf
- 16 Sept/06 seen in group of 3 without calf
- 27 Feb/07 seen in group of 5 without calf
- 29 May/07 seen with calf
- 04 March/08 seen in group of 10 with calf
- 29 May/08 seen with calf
- 22 Oct/08 collar finished transmitting
- 3 March/09 seen in group of 3 with calf
- 2 March/10 seen in group of 7 without calf

Animal #127 (Sat, died)

- 22 Jan/06 collared
- 1 March/06 seen in group of 7 with calf
- 29 May/06 seen with calf
- Died 1-5 July/06, likely wolf predation
- 16 Sept/06 confirm carcass
- 23 Oct/06 collar retrieved

Animal #126 (Sat, released)

- 21 Jan/06 collared
- 1 March/06 seen in group of 5 with yearling
- 30 May/06 seen with calf
- 26 Feb/07 seen in group of 13 without calf
- 29 May/07 seen without calf
- 03 March/08 seen in group of 14 without calf
- 28 May/08 seen with calf
- 2 March/09 seen in group of 5 without calf
- 15 April/09 collar released
- 1 June/09 unable to locate; lots of water in area

Animal #125 (Sat, died)

- 22 Jan/06 collared
- 1 March/06 seen in group of 16 with yearling
- 29 May/06 seen with small calf
- Died 12-15 July/06, likely wolf predation
- 16 Sept/06 no visual
- 23 Oct/06 collar retrieved

Animal #124 (Sat, died)

- 20 Jan/06 collared
- 2 March/06 seen in group of 7 without calf
- Died 13-19 May/06, likely wolf predation
- 23 Aug/06 collar retrieved

Animal #123 (Sat, died)

- 20 Jan/06 collared
- 2 March/06 seen in group of 4 with calf
- 29 May/06 without calf
- 16 Sept/06 seen in group of 3
- Died 1-5 Nov/06 on Trainor Lake
- 15 Feb/07 locate collar in ice
- 27 Feb/07 collar retrieved

Animal # 122 (Sat, unknown status)

- 4 March/05 collared
- 21 March/05 seen in group of 3
- 30 March/05 seen in group of 3
- 1 June/05 seen alone without calf
- 4 June/05 no visual
- 23 Sept/05 no visual
- 10 Oct/05 no visual
- 31 Nov/05 no satellite signal
- 4 April/05 got satellite signal back
- 30 May/05 seen without calf
- 24 Nov/06 no satellite signal
- 15 June/07 collar went off air finishing transmissions

Animal #121 (Sat, died)

- 4 March/05 collared
- 21 March/05 seen in group of 3
- Died 26-27 March predated by wolves
- 30 March/05 collar retrieved

Animal #120 (Sat, released)

- 4 March/05 collared
- 21 March/05 seen in group of 13
- 30 March/05 seen in group of 3
- 1 June/05 no visual
- 4 June/05 seen alone without calf
- 23 Sept/05 seen in group of 14
- 10 Oct/05 no visual
- 16 Jan/06 seen in group of 3
- 1 March/06 seen in group of 5
- 30 May/06 without calf
- 26 Feb/07 seen in group of 10 without calf
- 30 May/07 seen without calf
- 7 Dec/07 seen in group of 4 without calf
- 3 March/08 seen in group of 4 without calf
- 28 May/08 seen with calf
- 7 Oct/08 transmissions from collar ceased
- 2 March/09 see in group of 6 without calf
- 3 March/09 collar released
- 29 Aug/09 collar retrieved

Animal # 119 (Sat, released)

- 4 March/05 collared
- 21 March/05 seen in group of ≥ 8
- 30 March/05 no visual
- 1 June/05 seen alone without calf
- 23 Sep/05 no visual
- 10 Oct/05 no visual
- 16 Jan/06 in group of 5 without calf
- 1 March/06 in group of 4
- 30 May/06 with calf
- 22 Jan/07 in group of 3 with calf
- 26 Feb/07 in group of 11 with calf
- 29 May/07 seen without calf
- 3 March/08 seen with cow
- 28 May/08 seen with calf
- 10 Sept/08 collar finished transmitting
- 2 March/09 seen in group of 5 without calf
- 3 March/09 collar released
- 2 June/09 collar retrieved

Animal # 118 (Sat, died)

- 4 March/05 collared
- 21 March/05 seen in group of 10
- 30 March/05 seen in group of 9
- 1 June/05 no visual
- 4 June/05 no visual
- Died 15-21 June/05, likely wolf predation
- 6 Sept/05 collar retrieved

Animal #117 (Sat, died)

- 3 March/05 collared
- 10 April/05 not checked on
- 5 May/05 not checked on
- 31 May/05 seen alone without calf
- 10 June/05 seen in thick brush
- 23 Sept/05 seen in group of at least 4
- 5 Oct/05 not checked on
- 26 Jan/06 seen in group of 4 with calf
- 2 March/06 seen in group of 5 with calf
- Died 17-21 April/06
- 28 Aug/06 collar retrieved

Animal #116 (Sat, released)

- 3 March/05 collared
- 10 April/05 not checked on
- 5 May/05 not checked on
- 31 May/05 seen alone without calf
- 10 June/05 no visual
- 23 Sept/05 seen in group of 3
- 5 Oct/05 not checked on
- 26 Jan/06 seen in group of 7 with calf
- 2 March/06 seen in group of 4 with calf
- 29 May/06 seen with calf
- 16 Sept/06 seen in group of 2 without calf
- 23 Jan/07 seen in group of 12 without calf
- 27 Feb/07 seen in group of 6 without calf
- 30 May/07 seen in group of 3 with calf
- 4 March/08 seen with bull
- 29 May/08 seen with calf
- 13 Oct/08 collar stopped satellite transmissions
- 3 March/09 seen in group of 17 without calf
- 3 March/09 collar released
- 7 July/09 collar retrieved

Animal #115 (Sat, released)

- 3 March/05 collared
- 10 Apr/05 seen in group of 3
- 5 May/05 not checked on
- 31 May/05 seen alone without calf
- 10 June/05 not checked on
- 23 Sept/05 no visual
- 5 Oct/05 seen in group of 2 without calf
- 2 March/06 seen in group of 9 without calf
- 30 May/06 seen in group of 2 without calf
- 16 Sept/06 seen in group of 4 without calf
- 27 Feb/07 seen in group of 4 without calf
- 29 May/07 seen with calf
- 04 March/08 seen with 2 cows
- 30 May/08 seen with calf
- 1 Oct/08 collar stopped satellite transmissions
- 4 March/09 seen in group of 3 with calf
- 3 March/09 collar released
- 10 August/09 collar retrieved

Animal #114 (Sat, released)

- 3 March/05 collared
- 10 April/05 seen in group of 9
- 5 May/05 not checked on
- 31 May/05 no visual
- 10 June/05 seen alone without calf
- 23 Sept/05 no visual
- 5 Oct/05 not checked on
- 2 March/06 seen in group of 6 without calf
- 29 May/06 seen in group of 3 without calf
- 16 Sept/06 seen in group of 3 without calf

- 27 Feb/07 seen in group of 6 without calf
- 30 May/07 seen with without calf
- 4 March/08 seen in group of 7 without calf
- 29 May/08 seen with calf
- 3 July/09 collar stopped satellite transmissions
- 3 March/09 seen in group of 13 with calf
- 3 March/09 collar released
- 1 June/09 collar retrieved

Animal #113 (Sat, died)

- 3 March/05 collared
- 10 April/05 seen in group of 4
- 5 May/05 not checked on
- 31 May/05 no visual
- 10 June/05 seen alone without calf
- Died 2-8 Sept/05 likely wolf predation
- 5 Oct/05 collar retrieved

Animal #112 (Sat, released)

- 3 March/05 collared
- 10 April/05 seen with calf
- 5 May/05 not checked on
- 31 May/05 seen with calf
- 10 June/05 seen with calf
- 23 Sept/05 no visual
- 5 Oct/05 not checked on
- 1 March/06 seen in group of 6 with calf
- 30 May/06 seen in group of 4 with calf
- 16 Sept/06 seen with calf
- 27 Feb/07 seen in group of 5 with calf
- 29 May/07 seen with calf
- 5 March/08 seen with 2 bulls
- 29 May/08 not located
- 30 June/08 located, no visual
- 22 Oct/08 collar stopped satellite transmissions
- believe collar released from caribou March/09
- 3 March/09 collar released
- 6 July/09 collar retrieved

Animal #111 (Sat, released)

- 3 March/05 collared
- 10 April/05 not checked on
- 5 May/05 seen in group of 2
- 31 May/05 seen with calf
- 10 June/05 not checked on
- 23 Sept/05 seen in group of 5 with calf
- 5 Oct/05 not checked on
- 1 March/06 seen in group of 9 without calf
- 29 May/06 seen with calf
- 16 Sept/06 seen in group of 3
- 24 Jan/07 seen in group of 14
- 27 Feb/07 seen in group of 4 with calf
- 30 May/07 seen with calf
- 4 March/08 seen in group of 8 with calf
- 28 May/08 seen with calf
- 11 Nov/08 collar stopped satellite transmissions
- 3 March/09 seen in group of 11 with calf
- 3 March/09 collar released
- 10 July/09 collar retrieved

Animal #110 (Sat, died)

- 5 March/05 collared
- 10 April/05 not checked on
- 5 May/05 seen alone without calf
- 31 May/05 seen alone without calf
- 10 June/05 not checked on
- Died 5-11 June/05 likely wolf predation
- 29 July/05 collar retrieved

Animal #109 (Sat, died)

- 1 April/04 collared
- 29 May/04 no visual
- 3 June/04 not checked on
- 22 September/04 seen in group of 4 without calf
- 25 Jan/05 not checked on
- 31 May/05 seen with calf
- 19 June/05 seen with calf
- 23 Sept/05 no visual
- 5 Oct/05 seen in group of 3 with calf
- Died 22-25 April/06, likely wolf predation
- 23 Aug/06 collar retrieved

Animal #108 (Sat, observed alive, no Sat or VHF active)

- 1 April/04 collared
- 29 May/04 seen alone without calf
- 3 June/04 no visual
- 22 Sept/04 seen in group of 3 without calf
- 25 Jan/05 seen in group of 4 without calf
- 31 May/05 no visual
- 10 June/05 no visual
- 19 June/05 seen with calf
- 23 Sept/05 no visual
- 5 Oct/05 seen in group of 5 with calf
- 2 March/06 seen in group of 3 with yearling
- 30 May/06 seen with calf
- 23 Jan/06 seen in group of 5 with calf
- 27 Feb/07 seen in group of 11with calf
- 30 May/07 seen in group of 3 with calf
- 15 June/07 collar stopped satellite transmissions
- 3 March/09 seen in group of 3 with #146, no VHF active

Animal #107 (Sat, died)

- 1 April/04 collared
- 29 May/04 no visual
- 3 June/04 not checked
- 22 Sept/04 seen in group of 3 with calf
- 25 Jan/05 not checked
- Died 14-17 April/05 likely wolf predation
- 4 May/05 collar retrieved

Animal #106 (Sat, died)

- 30 March/04 collared
- 29 May/04 no visual
- 3 June/04 seen in group of 2 with calf
- 22 Sept/04 seen in group of 7 without calf
- 25 Jan/05 seen in group of 5 without calf
- 31 May/05 seen alone without calf
- 23 Sept/05 seen in group of 2 without calf
- Died 21-24 Nov/05, likely wolf predation
- 30 May/06 collar retrieved

Animal #105 (Sat, died)

- 30 March/04 collared
- 29 May seen in group of 3 with calf
- 3 June/04 not checked on
- 22 Sept/04 no visual
- 25 Jan/05 seen in group of 3 without calf
- 31 May/05 seen alone without calf
- 19 June/05 seen alone without calf
- 23 Sept/05 no visual
- 2 March/06 seen in group of 11 without calf
- 23 Aug/06 collar retrieved

Animal #104 (Sat, died)

- 29 March/04 collared
- 29 May/04 seen in group of 3 without calf
- 3 June/04 seen in group of 3 without calf
- 22 Sept/04 no visual
- 25 Jan/05 not checked on
- Died 19-27 April/05, death probably related to old age
- 4 May/05 collar retrieved

Animal #103 (Sat, died)

- 1 April/04 collared
- 29 May/04 seen in group of 3 with calf
- 3 June/04 not checked on
- 22 Sept/04 no visual
- 25 Jan/05 not checked on
- Died 25-30 April/05, likely wolf predation
- 4 May/05 collar retrieved

Animal #102 (Sat, died)

- 29 March/04 collared
- Died 14-15 May/04, wolf predation
- 3 June/04 collar retrieved

Animal # 101 (Sat, died)

- 30 March/04 collared
- Died during month of May/04, likely wolf predation
- 9 August/04 collar retrieved

Animal # 100 (Sat, no Sat or VHF active)

- 29 March/04 collared
- 29 May/04 seen in group of 3 without calf
- 3 June/04 seen alone without calf
- 22 Sept/04 no visual
- 25 Jan/05 seen in group of 11, without calf
- 31 May/05 seen in group of 3 with calf
- 19 June/05 seen alone without calf
- 23 Sept/05 a problem with VHF reception
- 30 Oct/06 a problem with satellite signal reception
- 6 Feb/06 no satellite/VHF signal
- 27 Feb/07 no visual
- 30 May/07 no visual
- 15 June/07 collar stopped satellite transmissions